

B.B.A. Semester - 5 (CBCS) Examination**Oct/Nov.- 2024 (Old Course)****STATISTICS GROUP: FUNDAMENTALS OF OPERATION RESEARCH (ELECTIVE)****Time: 2:30 Hours****Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

- Que-1 (A) Explain Scope of operations research. (07)
 (B) Explain advantages and drawbacks of O.R. model. (07)

OR

- Que-1 (A) What are essential features of the O.R. Model. (07)
 (B) Briefly mention the various phases of O.R. (07)
 Que-2 (A) Explain the term Degeneracy in the transportation problem. (07)
 (B) Show how to balance the transportation model when it is unbalanced. Also explain the interpretation of the optimal solution of an unbalanced transportation problem. (07)

OR

- Que-2 Find the optimal solution of the following transportation problem. (14)

	D ₁	D ₂	D ₃	D ₄	D ₅	Supply
O ₁	20	10	15	20	19	40
O ₂	5	8	12	5	7	30
O ₃	6	15	10	7	10	50
O ₄	8	12	11	8	14	70
Demand	40	60	20	40	60	

- Que-3 (A) Enumerate the similarities and difference between assignment and transportation techniques. (07)
 (B) How will you handle the following situations in an assignment problem (07)
 (i) maximization (ii) unbalanced problem?

OR

- Que-3 A captain of a cricket team has to allot five middle positions to five batsmen. The average runs scored by each batsman at these positions are as follows: (14)

	Batting positions					
Batsmen		III	IV	V	VI	VII
	A	40	40	35	25	50
	B	42	30	16	25	27
	C	50	48	40	60	50
	D	20	19	20	18	25
	E	58	60	59	55	53

- Que-4 (A) Explain advantage and drawback of L.P.P. (07)
 (B) Explain graphic Method. (07)

OR

- Que-4 A Small-Scale industry manufactures electrical regulators, the assembly of which being accomplished by a small group of skilled workers, both men and women. Due to the limitations of space and finance the number of workers cannot exceed 11 and their salary bill not more than Rs. 60,000 per month. The male members of the skilled workers are paid Rs. 6,000 per month, while the female worker doing the same work as the male members gets Rs.5,000 Per month. Data collected on the performance of these workers indicated that a

male member contributes Rs. 10,000 per month to total return of the industry, while the female workers contribute Rs. 8,500 per month. Determine the number of male and female workers to be employed in order to maximize the monthly total return by graphic method.

Que-5 (A) Define (07)

(i) Slack Variables

(ii) Surplus Variable

(iii) Artificial Variable

(B) Explain Simplex Method. (07)

OR

Que-5 Solve following LPP by simplex method. (14)

$$\text{Max } Z = 4x + 5y$$

Subject to constraint

$$2x + 4y \leq 120$$

$$3x + 2y \leq 120$$

$$x, y \geq 0$$
